L4: Entry 11 of 23 File: USPT Jun 11, 2002

US-PAT-NO: 6405132
DOCUMENT-IDENTIFIER: US 6405132 B1
**** See image for Certificate of Correction ****

TITLE: Accident avoidance system

DATE-ISSUED: June 11, 2002

INVENTOR-INFORMATION:

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APPL-NO: 09/ 679317 [PALM]
DATE FILED: October 4, 2000

PARENT-CASE:
CROSS REFERENCE TO RELATED APPLICATIONS This application is a continuation-in-part of U.S. patent application Ser. No. 09/523,559 filed Mar. 10, 2000 which in turn is a continuation-in-part of U.S. patent application Ser. No. 09/177,041 filed Oct. 22, 1998 which claims priority under 35 U.S.C. .sctn.119(e) of U.S. provisional patent application Ser. No. 60/062,729 filed Oct. 22, 1997. This application also claims priority under 35 U.S.C. .sctn.119(e) of U.S. provisional patent application Ser. No. 60/123,882 filed Mar. 11, 1999 through the '559 application. This patent is also a continuation in part of U.S. patent application Ser. No. 09/024,085 filed Feb. 27, 1998, now U.S. Pat. No. 6,209,909 which is a continuation in part of U.S. patent application Ser. No. 08/247,760 filed May 23, 1994, now abandoned.

INT-CL: [07] G01 C 23/00, G06 F 17/00

US-CL-ISSUED: 701/301; 701/213, 701/45, 701/117
US-CL-CURRENT: 701/301; 701/117, 701/213, 701/45

FIELD-OF-SEARCH: 701/301, 701/213, 701/45, 701/23, 701/117, 701/216, 342/357.06, 342/357.09, 342/357.08, 340/436

PRIOR-ART-DISCLOSED:

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ART-UNIT: 3661

PRIMARY-EXAMINER: Zanelli; Michael J.

ATTY-AGENT-FIRM: Roffe; Brian

ABSTRACT:

System and method for preventing vehicle accidents in which GPS ranging signals relating to a host vehicle's position on a roadway on a surface of the earth are received on a first communication link from a network of satellites and DGPS auxiliary range correction signals for correcting propagation delay errors in the GPS ranging signals are received on a second communication link from a station or satellite. The host vehicle's position on a roadway on a surface of the earth is determined from the GPS, DGPS, and accurate map database signals with centimeter accuracy and communicated to other vehicles. The host vehicle receives position information from other vehicles and determines whether any other vehicle from which position information is received represents a collision threat to the host vehicle based on the position of the other vehicle relative to the roadway and the host vehicle. If so, a warning or vehicle control signal response to control the host vehicle's motion is generated to prevent a collision with the other vehicle.

53 Claims, 17 Drawing figures

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L7: Entry 1 of 1 File: USPT Jun 19, 2001

DOCUMENT-IDENTIFIER: US 6249720 B1
TITLE: Device mounted in vehicle

Brief Summary Text (12):
In a preferred embodiment, the first sensor means detects at least one vehicle condition selected from the group consisting of a current vehicle position, a current vehicle speed, a current shift position, winker operation, wiper operation, a coolant temperature, an engine oil temperature, an engine oil pressure, a passenger room temperature, an open air temperature, ignition switch operation, a brake pedal stroke, an accelerator pedal stroke, side brake operation, horn operation, belt loosening, a fuel remainder, light or lamp operation, seat belt operation, door opening, window opening, ABS operation, air-conditioner operation, distance to the preceding and succeeding vehicles and decrease of air pressure in tire.

Detailed Description Text (11):
Direction sensor 212 includes a terrestrial magnetism sensor that detects terrestrial magnetism to determine orientation of the vehicle, a gyromagnetic sensor that detects a rotational angle velocity of the vehicle that is integrated to determine orientation of the vehicle, a pair of wheel sensors that detect an output pulse difference (a difference of movement between left and right wheels) to detect an angle of gyration of the vehicle. Steering sensor 213 employs an optical sensor or rotation resistance volume mounted to a rotating member of a steering to detect a steering angle. Distance sensor 214 detects a distance of movement by detecting revolution of the wheels or acceleration, for example.

Detailed Description Text (35):
The default value includes initial values such as time, number, temperature, vehicle speed, data, etc. The default value is used to initialize data when data has been changed by the driver, for example, when the driver has changed the ignition-on operation time from the initial value of 24:00 to his or her desired time, as described before.

Detailed Description Text (50):
As shown in FIG. 8, current status sensor 40 includes an ignition sensor 401, a vehicle speed sensor 402, an accelerator sensor 403, a brake sensor 404, a side brake sensor 405, a shift position sensor 406, a winker sensor 407, a wiper sensor 408, a light sensor 409, a seat-belt sensor 410, a door opening sensor 411, a passenger sensor 412, a room temperature sensor 413, an open air temperature sensor 414, a fuel remainder sensor 415, a coolant temperature sensor 416, an ABS sensor 417, an air-conditioner sensor 418, a weight sensor 419, a fore-distance sensor 420, a rear-distance sensor 421, a body temperature sensor 422, a pulse rate sensor 423, a perspiration sensor 424, a brain wave sensor 425, an eye-tracer 426, an infrared sensor 427, and other sensors 428 for detecting, for example, decrease of air pressure of tires, loosening of belts, opening of windows, operation of horn, oil temperature, oil pressure, etc. As noted from the above, current status sensor 40 is used to detect various vehicle conditions and driver's conditions in this embodiment. In modification, only vehicle conditions or only driver's conditions

may be detected by current status sensor 40. Sensors are mounted at suitable location inside or outside of the vehicle, respectively. Usually one sensor is used for one sensing purpose. However, it may be possible that some kind of sensor receives the detection signal from another sensor to carry out indirect sensing. For example, an air-pressure sensor may indirectly detect a decrease of an air-pressure of a tire in response to a change of a signal from a wheel velocity sensor.

Detailed Description Text (51):
Ignition sensor 401 detects ON and OFF of an ignition starter. Vehicle speed sensor 402 may be of any conventional type including one wherein a rotation angle velocity or revolution of a speed meter cable is detected to calculate a vehicle speed. Accelerator sensor 403 detects a degree of push stroke of an accelerator pedal. A brake sensor 404 detects a push stroke, push force or push speed of a brake pedal to discriminate if the driver makes an emergency brake. Side brake sensor 405 detects operation or non-operation of a side brake. Shift position sensor 406 detects the current position of a transmission shift lever. Winker sensor 407 detects which winker is lightened. Wiper sensor 408 detects wiper drive conditions (especially, wiper speed). Light sensor 409 detects various lights and lamps such as head lights, tail lamps, fog lamps, room lamps, etc. being lightened. Seat-belt sensor 410 detects if the driver and passengers are equipped with seat-belts. If at least one of them is not equipped with a seat-belt, the corresponding communication program is working such that the agent appears on display 27 to give warning, notice, advice, etc., one of which is selected by the results of study.

Detailed Description Text (88):
The vehicle condition on the abscissa of the table 297 in FIG. 14 includes whether or not the vehicle is in a high-speed (say, more than 80 km/hour) drive, whether or not the vehicle is out of the prescheduled route, whether or not the vehicle interior is noisy (than a predetermined noise level), the total number of ignition-on operation, etc.

Detailed Description Text (105):
In accordance with this embodiment, the agent is more personified to make human communication with the driver. Even when the same communication program is applied, the agent's speaking pattern changes in response to the current status, for example. When the vehicle is driving with the windows opened, the agent speaks loudly. When the vehicle is in a traffic jam on a rainy day, the agent is out of humor, whereas the agent speaks cheerfully during driving at high speed along a seaside road (that can be detected by navigation processing unit 10) on a fine day.

Detailed Description Text (197):
The agent's appearance and activity in this embodiment will be described hereunder in reference to FIGS. 48A-50 by way of example. FIGS. 48A-48C illustrates an example of the agent control operation executed after the ignition switch is turned on. As shown in FIG. 48A, agent processing unit 11 acquires, as the current status, a time elapse T1 from the ignition-on from a detection signal from a timer (one of sensors 40). It has also been confirmed that current vehicle speed is 35 kg/h, the driver's voice is recognizable, the wiper is working, the current season is summer, the current driver's familiarity is 27, etc. Further, agent processing unit 11 make reference to the response data 293 to confirm that the driver showed "acceptance" to the agent's activity in the latest two application of the program No. 00123. The current default value T0 stored in the study item data 292 is 120 minutes. Then, it has also been confirmed that the elapsed time T1.gtoreq.T0.

Detailed Description Text (202):
In the above-described embodiment, a plurality of selectable agent's appearance has respective image data stored in the image data memory section 294. However, it may be possible that one or several image data is prepared for one communication

program and changed by image processing unit 13 in accordance with the current status. Change of the agent's appearance may include change or the agent itself. For example, the agent is a rabbit when the vehicle is running at a high speed whereas the agent is a turtle during low-speed drive. When the current status is that the driver's voice is recognizable, the agent may appear on display 27 carrying a nameboard of "PLEASE" or two nameboards of "YES" and "NO" (FIG. 50) for urging the driver to make a suitable response to the agent's activity in the last communication program.

CLAIMS:

2. A guidance device according to claim 1 wherein said first sensor means detects at least one vehicle condition selected from the group consisting of a current vehicle position, a current vehicle speed, a current shift position, blinker operation, wiper operation, a coolant temperature, an engine oil temperature, an engine oil pressure, a passenger compartment, an ambient air temperature, ignition switch operation, a brake pedal depressing stroke, an accelerator pedal depressing stroke, hand brake operation, horn operation, belt loosening, a fuel remainder, light or lamp operation, seat belt operation, door opening, window opening, ABS operation, air-conditioner operation, distance to the preceding and succeeding vehicles and decrease in tire, air pressure.

22. A guidance device according to claim 21 wherein said first sensor means detects at least one vehicle condition selected from the group consisting of a current vehicle position, a current vehicle speed, a current shift position, blinker operation, wiper operation, a coolant temperature, an engine oil temperature, an engine oil pressure, a passenger compartment temperature, an ambient air temperature, ignition switch operation, a brake pedal depressing stroke, an accelerator pedal depressing stroke, hand brake operation, horn operation, belt loosening, a fuel remainder, light or lamp operation, seat belt operation, door opening, window opening, ABS operation, air-conditioner operation, distance to the preceding and succeeding vehicles and decrease in tire air pressure.

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L4: Entry 6 of 23 File: USPT Jun 10, 2003

DOCUMENT-IDENTIFIER: US 6577933 B2
TITLE: Electronically tracked road-map system

Application Filing Date (1):
20010507

Brief Summary Text (7):
Driving a ground vehicle (a passenger car, a bus, or a truck) can be painful and dangerous, especially when driving over long distance with heavy traffic. Although a collision avoidance radar can help detecting the protrusion of an unexpected object (a pedestrian, an interrupting vehicle, or a falling rock on the road) driving a ground vehicle always requires full attention of the driver. Although a global positioning system (GPS) antenna can locate the receiver position with an accuracy of .about.100 m, the spatial resolution is not sufficient for guiding a ground vehicle sailing on the road, even not to mention the possibility that GPS signals are apt to be blocked by mountains and buildings, especially when passing through a tunnel. During your way home from work, or vise versa, even if you have driven the same road one hundred times, you still have to pay equal attention for your 101.sup.st drive. At present, unmanned vehicle on the road is almost impossible. Thousands of truck drivers are employed delivering cargos routinely and repetitively from one port to another. Car accidence occurs everyday and every moment. The way of driving a ground vehicle is essentially the same as it was 50 years ago, even if we have entered the computer age with versatile communication skills. Safe, reliable, and efficient driving systems are in big demand by our society.

Brief Summary Text (8):
Accordingly, it is an objection of the invention to address one or more of the foregoing disadvantages or drawbacks of the prior art, and to provide such an improved method to obtain computer-aided driving systems for ground vehicles for assistance in road riding. By combining the other existing tools in navigation, for example, anti-collision radars, remote cameras, light detectors, and GPS antennas, this invention makes it possible for automated driving, at least partially, in addition to other advantages in route finding, position reporting, risk analyzing and alerting, etc.

Detailed Description Text (3):
The invention provides a method which sets up tracks on roads confining and guiding the movement of a ground vehicle. The tracks are virtually recorded in a computer storage medium forming an electronic map with high spatial resolution. Once launched in the track-map system, a ground vehicle can then, if requested, travel by itself, configuring the correct route, watching out for an accidence, and analyzing traffic and road conditions, thereby adding safety and efficiency to the driving of the ground vehicle.

Detailed Description Text (6):
On driving a ground vehicle two things are continuously practiced and noticed: the instantaneous speed (velocity) and direction (orientation). Assuming there is no other vehicles on the road, no traffic lights, and no unexpected interrupts and protrusions, once the speed and direction are known as a function of time, the

vehicle's motion is completely determined. After integrated with time, the speed data become distances, and hence if the direction of the vehicle is known as a function of the traveled distance, the trace of the vehicle is completely determined. The advantage of using this direction-versus-distance expression is that it is independent of the speed of the vehicle: The vehicle can go slower or faster, but its trace will all remain the same. This converts the track of a road, or a traveling route, into two columns of numbers: speed and direction. A track is thus a series of points located on the road with fine spatial resolution. An electronic track, once established, can be used by a ground vehicle of any kind, including a passenger car, a van, a bus, a truck, or even a motorcycle.

Detailed Description Text (8):
The electronic tracks are marked at positions where traffic lights appear. If light detectors are installed with the vehicle capable of detecting the colors of traffic lights, the computer looks out for traffic lights in priori so as to decide whether to go beyond them or to stop before them. Collision avoidance radar is installed with the vehicle so that unexpected protrusion of objects, including unsafe approach by other vehicles, can be detected and handled promptly and properly. Stop signs and road construction signs, for example, can be visualized via an image recognition radar, or by other means including listening to some special signals emitted from devices installed with these signs, which can be ultrasonic, electromagnetic, or optical in nature. Speed regulation signs may also be checked in a similar manner.

Detailed Description Text (9):
Multiple tracks are included for a road consisting of many lanes and/or a shoulder. This allows for the ground vehicle to change lanes if the computer decides to do so. Responses to other emergent situations, for example, engine breakdown, detouring, and yielding to an ambulance car, etc, can also be programed beforehand for the computer. The driver is now allowed to sit back and relax and it is the computer and the peripheral sensors/radars that are physically performing the tedious task driving the vehicle. In an unmanned vehicle remote cameras are installed so that the sailing or gliding of the vehicle along tracks can be monitored and controlled at a distance. For example, in the command room an operator can simultaneously drive, say, 10 trucks traveling though routes around the country. This results in safety, economy, and efficiency. Unmanned vehicles are thought to be most effective in shuttling among ports connected by highways where only a limited number of traffic lights appear.

Detailed Description Text (10):
Many electronic tracks can emerge to form a road map. This electronically tracked road-map system can show intelligence, providing both the static and the dynamic information on the road. For example, by entering two addresses the computer can calculate a route with the shortest time for traveling considering the real traffic on the road. This is achieved by connecting the computer with a web site (or sites) updating the traffic information on the road in a real-time fashion. Thus, it is possible to locate, to trace down, and to plan a reception party at the arrival of a traveler.

Detailed Description Text (13):
At times the computer needs to verify the track information comparing to the actually measured data in driving distance and direction. This can be done by setting up calibration points along the tracks of a road. For example, the calibration points can be allocated coincident with the positions of traffic lights, or the milestone marks in a highway, so that each time a set of traffic lights, or a milestone mark, is passed, a calibration process is called, thereby modifying the current readings in odometer and in steering-wheel position, if necessary. This calibration process can effectively inhibit the growth of track errors. A GPS antenna may be installed with a ground vehicle so that the vehicle can automatically launch into tracks stored in the computer. Otherwise, the initial

position of the vehicle needs to be entered manually, for example, by keying in a street number using the keyboard. An initial try-and-error process may be called before the vehicle is placed right on in an electronic track.

Detailed Description Text (14):
Today computers are very fast and the memory storage is huge and inexpensive. For a personal computer the CPU speed can be faster than 1 GHz and a hard drive of 100 G bytes is not uncommon. This makes an electronically tracked road-map system plausible. For example, assuming a spatial resolution of I foot and an angular resolution of 1 degree, an electronic track on a 100 mile road contains .about.10,000 binary numbers, occupying a memory space of roughly 40 K bytes. Extra space is needed for other data, such as positions of traffic lights, intersection with other road tracks, information on lanes and shoulders, etc. By all means, an electronically tracked road-map system can be conceivably installed and executed in a computer with moderate speed and memory space.

Current US Original Classification (1):
701/23

CLAIMS:

7. The method of claim 6 wherein said local markers include traffic-lights poles, or milestone stakes marks installed at the actual road sides or on the actual road surfaces corresponding to said electronic tracks.

10. The method of claim 1 wherein said one or more electronic tracks are annotated with supplemental data providing further information about road conditions, regulations, street names and numbers, number of lanes, shoulders, road widths, and other dynamic data which may be fetched in real time through wireless communication, including weather, traffic, and other emergent regulation conditions.

11. The method of claim 1 wherein other equipments including light sensors, GPS locators, video camera, collision avoidance radars, speed controller, or gyroscopes are used in conjunction with said electronic tracks to provide further services and assistance to said ground vehicle.

12. The method of claim 1 wherein said one or more electronic tracks are selected from a collection of electronic tracks forming an electronic map, which, upon request, is able to configure an optimal route connecting an initial point to a destination taking into account road conditions and traffic conditions.

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L4: Entry 6 of 23 File: USPT Jun 10, 2003

US-PAT-NO: 6577933
DOCUMENT-IDENTIFIER: US 6577933 B2

TITLE: Electronically tracked road-map system

DATE-ISSUED: June 10, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
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APPL-NO: 09/ 849894 [PALM]
DATE FILED: May 7, 2001

INT-CL: [07] G05 D 1/00

US-CL-ISSUED: 701/23
US-CL-CURRENT: 701/23

FIELD-OF-SEARCH: 701/23-27, 701/50, 701/200-202, 701/205-210, 701/213-214, 701/216, 701/301, 701/220-221, 701/223-224, 340/425.5, 340/427, 340/431-438, 340/933, 340/979, 340/937-938, 340/988, 340/989, 342/104, 342/106, 342/113, 342/357.12-357.14, 342/455-458, 180/167-168, 180/204

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected Search ALL Clear

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
☐	5155683	October 1992	Rahim	180/168
☐	5923270	July 1999	Sampo et al.	180/6.7
☐	6032084	February 2000	Anderson et al.	700/241
☐	6092010	July 2000	Alofs et al.	180/167
☐	6128574	October 2000	Diekhans	701/202

ART-UNIT: 3661

PRIMARY-EXAMINER: Nguyen; Thu

ABSTRACT:

Disclosed is a method for establishing and utilizing electronic tracks on roads for ground vehicles so as to ease the driving task with added safety and efficiency. Electronic tracks define traces on roads guiding the movement of a ground vehicle in as much as the same way that railroad tracks confine the movement of a train. Speed control can be achieved by using equipments detecting the driving conditions and the road environment along with the gliding action of the ground vehicle on electronic tracks. Automation in driving is thus possible, at least partially. Electronic map can be constructed consisting of many of the electronic tracks. Based upon both the static and dynamic information on roads, an electronic map is able to configure an optimal route connecting two addresses with the shortest time in traveling.

12 Claims, 0 Drawing figures

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L4: Entry 14 of 23 File: USPT Jan 2, 2001

DOCUMENT-IDENTIFIER: US 6169940 B1
TITLE: Automatic driving system

Abstract Text (1):
An automatic driving system which is provided for automatically driving vehicles to follow respective target running trajectories. A running instruction and a running course are set based on an obstacle detecting signal, a vehicle position signal, road data and automatic drive traffic information signals, and a vehicle-to-vehicle running information signal. A running course signal indicative of the running course and a running position setting position signal indicative of a running position of one vehicle at the time the running course is set are transmitted and received between the one vehicle and another vehicle, so that a target running trajectory suitable for each vehicle can be calculated on the basis of the received running course, thereby automatically navigating each vehicle such that the respective vehicles run following the resultant target running trajectories.

Application Filing Date (1):
19980901

Brief Summary Text (13):
The automatic driving system according to the present invention comprises radar means for detecting an obstacle in front of one vehicle to generate an obstacle detecting signal, imaging means for imaging a road surface in front of the one vehicle to output a video signal, image processing means for generating a vehicle position signal indicative of a position of the one vehicle in a width direction of the road from an image represented by the video signal, a navigation unit for generating road data indicative of the coordinates of a road in front of a current position of the one vehicle, road-to-vehicle communications means for receiving automatic drive traffic information signal, vehicle-to-vehicle communications means for transmitting and receiving a vehicle-to-vehicle running information signal between the one vehicle and at least one different vehicle other than the one vehicle, running instruction generating means for generating a running instruction, running course setting means for setting a running course based on the obstacle detecting signal, the vehicle position signal, the road data, the automatic drive traffic information signal, the vehicle-to-vehicle running information signal and the running instructions, target running trajectory calculating means for calculating a target running trajectory based on the set running course, and vehicle control means for controlling navigation of the one vehicle such that the one vehicle runs following the target running trajectory, wherein the vehicle-to-vehicle communications means transmits a running course signal indicative of the running course, and a running course setting position signal indicative of a running position of the one vehicle at the time the running course is set, thus automatically navigating a plurality of vehicles.

Detailed Description Text (3):
FIG. 2 illustrates in a block diagram form the configuration of an automatic driving system according to the present invention. This system comprises, in a front portion of a vehicle, not shown, a laser radar 10 for detecting the existence of an obstacle encountered in front of the vehicle, and a CCD (Charge Coupled Device) camera 11 serving as an imaging means for recognizing the form of the

surface of a road in front as well as a positional relationship between the vehicle itself and a lane. A video signal produced by the CCD camera 11 is supplied to an image processing ECU (Electric Control Unit) 12. The image processing ECU 12, based on a microcomputer, outputs road surface data and on-lane vehicle position data based on a video signal from the CCD camera 11. Outputs of the laser radar 10 and the image processing ECU 12 are supplied to a total plan ECU 13. The total plan ECU 13 is also supplied with outputs of a navigation unit 14, a road-to-vehicle communications unit 15 and a vehicle-to-vehicle communications unit 16. Here, as the infrastructure for constructing the automatic driving system, beacons totally controlled by a control center are disposed in side regions of the road at predetermined intervals, such that the road-to-vehicle communications unit 15 receives an automatic driving traffic information signal from the beacons. The vehicle-to-vehicle communications unit 16 transmits and receives vehicle-to-vehicle running information signals including a running course signal, a decelerated running signal and so on, later described, between the vehicle in which the communications unit 16 itself is equipped and another vehicle. The navigation unit 14 comprises a GPS (Global Positioning System) unit 17, a distance sensor 18, a yaw rate sensor 19, an acceleration sensor 20, and road map information 21 in which road map data is recorded, and obtains running information through a navigation controller 22. Since the configuration and operation of the navigation unit 14 is well known, detailed explanation thereon is omitted here.

Detailed Description Text (4):
The total plan ECU 13 has capabilities of determining running instructions such as maintaining a lane and changing a lane, through running instruction processing 24 based on information on obstacles in front of the vehicle from the laser radar 10; road information such as road surface conditions within a predetermined distance from the vehicle in the forward direction from the road-to-vehicle communications unit 15; or traffic information such as jam information. It should be noted herein that simultaneous reference to vehicle sensor information (direction, speed, acceleration and so on) and map information from the navigation unit 14 enables the acquisition of more accurate running condition information (allowable speed, allowable forward and backward accelerations, allowable lateral acceleration and so on).

Detailed Description Text (5):
FIG. 3 is a flowchart illustrating processing executed by the total plan ECU 13 to issue running instructions. Referring specifically to FIG. 3, the total plan ECU 13 determines whether it has received a vehicle leading signal indicating that this vehicle equipped with the total plan ECU 13 is a vehicle running at the top of a vehicle group (hereinafter referred to as the "leading vehicle") by a setting operation of a driver through an input device such as a keyboard, not shown, and stored the vehicle leading signal in a predetermined memory (not shown) in the total plan ECU 13 (step S1). At step S1, if the total plan ECU 13 has not received a vehicle leading signal, the running instruction processing is terminated. Conversely, if the total plan ECU 13 has received a vehicle leading signal at step S1, the total plan ECU 13 acquires data on a road in front of the leading vehicle (for example, in a range of 100 meters ahead from the leading vehicle) from the navigation unit 14, and a vehicle position signal from the image processing ECU 12 (step S2). The total plan ECU 13 obtains information on the road within all possible regions where the vehicle is likely to reach and pass through, by running from a current position. Next, the total plan ECU 13 detects any obstacles in accordance with a obstacle detecting signal supplied from the laser radar 10, or retrieves signals, for example, indicative of the presence or absence of an accident and, if any, the location of the accident, and so on in accordance with an automatic drive traffic information signal received by the road-to-vehicle communications unit 15 (step S3), and instructs the vehicle to travel from the currently running lane to another lane on which the vehicle can avoid these obstacles or the accident (step S7). In the detection of obstacles, the total plan ECU 13 may detect a vehicle running immediately in front at a low speed with a

reduced distance therebetween as an obstacle.

Detailed Description Text (8):
As the running instructions are issued by the running instruction processing 24 as described above, the total plan ECU 13 again extracts information related to the determined running instructions within a range of information which has been relied on by the running instruction processing 24 to determine the running instructions (for example, within a range of the aforementioned predetermined distance, i.e., 100 meters ahead from the vehicle), acquires the position of the vehicle in the width direction of the road through the CCD camera 11, and sets a sequence of points which serves as a running course within the information range that extends from the current position of the vehicle as a starting point to a running target location as an end point by target point sequence extraction processing 25. At this time, a running course signal indicative of the set running course and a running course setting position signal indicative of the running position of the vehicle at the time when the running course is set, are transmitted from the vehicle-to-vehicle communications unit 16 to another vehicle.

Detailed Description Text (30):
It should be noted that the laser radar 10, the CCD camera 11, the image processing ECU 12, the road-to-vehicle communications unit 15, the vehicle-to-vehicle communications unit 16, the running instruction processing 24, and the target point sequence extraction processing 25 correspond to radar means, imaging means, image processing means, road-to-vehicle communications means, vehicle-to-vehicle communications means, running instruction generating means, and running course setting means, respectively. Also, the pattern extraction processing 26 and the fitting processing 28 correspond to target running trajectory calculating means.

Detailed Description Text (31):
According to the automatic driving system of the present invention as described above, a running course is set based on an obstacle detecting signal, a vehicle position signal, road data, an automatic drive traffic information signal and a running instruction, and a target running trajectory can be calculated on the basis of the set running course signal, so that a vehicle is automatically steered to follow the calculated target running trajectory. In addition, a running course signal indicative of the set running course can be transmitted from a leading vehicle and received by a subsequent vehicle. The subsequent vehicle derives a target running trajectory based on the running course signal received from the leading vehicle, and is automatically steered to follow the resultant target running trajectory, so that the subsequent vehicle can maintain smooth running suitable therefor based on the received running course signal, even if the leading vehicle, which has transmitted the signal, is in a running condition in which the leading vehicle is not drawing a smooth curve along a lane.

Current US Original Classification (1):
701/23

CLAIMS:

1. An automatic driving system comprising:

radar means for detecting an obstacle in front of one vehicle to generate an obstacle detecting signal;

imaging means for imaging a road surface in front of said one vehicle to output a video signal;

image processing means for generating a vehicle position signal indicative of a position of said one vehicle in a width direction of the road from an image represented by the video signal;

a navigation unit for generating road data indicative of the coordinates of a road in front of a current position of said one vehicle;

road-to-vehicle communications means for receiving automatic drive traffic information signal;

vehicle-to-vehicle communications means for transmitting and receiving a vehicle-to-vehicle running information signal between said one vehicle and at least one different vehicle other than said one vehicle;

running instructions generating means for generating a running instruction;

running course setting means for setting a running course based on said obstacle detecting signal, said vehicle position signal, said road data, said automatic drive traffic information signal, said vehicle-to-vehicle running information signal, and said running instruction; and

vehicle control means for controlling navigation of said one vehicle such that said one vehicle runs following a target running trajectory based on said set running course,

wherein said vehicle-to-vehicle communications means transmits a running course signal indicative of said running course, and a running course setting position signal indicative of a running position of said one vehicle at the time said running course is set.

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L4: Entry 14 of 23 File: USPT Jan 2, 2001

US-PAT-NO: 6169940
DOCUMENT-IDENTIFIER: US 6169940 B1

TITLE: Automatic driving system

DATE-ISSUED: January 2, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Jitsukata; Eishi	Wako			JP
Kobayashi; Sachio	Wako			JP
Tamura; Kazuya	Wako			JP

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Honda Giken Kogyo Kabushiki Kaisha	Tokyo			JP	03

APPL-NO: 09/ 145425 [PALM]
DATE FILED: September 1, 1998

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
JP	9-238464	September 3, 1997
JP	9-304645	November 6, 1997

INT-CL: [07] B62 D 13/00, G05 D 1/03

US-CL-ISSUED: 701/23; 701/24, 340/903
US-CL-CURRENT: 701/23; 340/903, 701/24

FIELD-OF-SEARCH: 701/23, 701/24, 701/25, 701/26, 701/28, 701/41, 701/96, 701/205, 701/301, 340/902, 340/903, 340/905, 340/435, 340/436

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected Search ALL Clear

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
☐	5295551	March 1994	Sukonick	180/167
☐	5331561	July 1994	Barrett et al.	701/205

☐	5467284	November 1995	Yoshioka et al.	701/300
☐	5483453	January 1996	Uemura et al.	701/28
☐	5680122	October 1997	Mio	340/932
☐	5764139	June 1998	Nojima et al.	340/461
☐	5828968	October 1998	Iiboshi et al.	701/23
☐	5913375	June 1999	Nishikawa	180/158
☐	5938707	August 1999	Uehara	701/41

ART-UNIT: 361

PRIMARY-EXAMINER: Nguyen; Tan

ATTY-AGENT-FIRM: Arent Fox Kintner Plotkin & Kahn, PLLC

ABSTRACT:

An automatic driving system which is provided for automatically driving vehicles to follow respective target running trajectories. A running instruction and a running course are set based on an obstacle detecting signal, a vehicle position signal, road data and automatic drive traffic information signals, and a vehicle-to-vehicle running information signal. A running course signal indicative of the running course and a running position setting position signal indicative of a running position of one vehicle at the time the running course is set are transmitted and received between the one vehicle and another vehicle, so that a target running trajectory suitable for each vehicle can be calculated on the basis of the received running course, thereby automatically navigating each vehicle such that the respective vehicles run following the resultant target running trajectories.

3 Claims, 9 Drawing figures

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WEST Search History

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DATE: Monday, November 22, 2004

Hide?	Set Name	Query	Hit Count
		DB=EPAB,JPAB,DWPI; THES=ASSIGNEE; PLUR=YES; OP=OR	
☐	L14	L8 and ((steer$ or speed$) with control$)	3
		DB=EPAB,JPAB,DWPI,TDBD; THES=ASSIGNEE; PLUR=YES; OP=OR	
☐	L13	L9 and ((steer$ or speed$) with control$)	0
		DB=EPAB,JPAB,DWPI; THES=ASSIGNEE; PLUR=YES; OP=OR	
☐	L12	L10	0
☐	L11	L8	100
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☐	L10	L9 and ((steer$ or speed$) with control$)	31
☐	L9	L8 and gps	96
☐	L8	=20030422	458
		DB=USPT; THES=ASSIGNEE; PLUR=YES; OP=OR	
☐	L7	6249720.pn. and (velocit$ or speed$)	1
☐	L6	6249720.pn. and (velocit$ with control$)	0
☐	L5	6249720.pn. and (speed$ with control$)	0
☐	L4	l2 and L3	23
☐	L3	701/2,19,20,23,1,201-202,233,211,213,28.ccls.	3843
☐	L2	L1 and GPS	148
☐	L1	=20030422	812

END OF SEARCH HISTORY

L4: Entry 21 of 23 File: USPT Aug 17, 1999

US-PAT-NO: 5938707
DOCUMENT-IDENTIFIER: US 5938707 A
** See image for Certificate of Correction **

TITLE: Automatic steering system for automatically changing a moving line

DATE-ISSUED: August 17, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Uehara; Yasuo	Toyota			JP

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Toyota Jidosha Kabushiki Kaisha	Aichi-ken			JP	03

APPL-NO: 08/ 696539 [PALM]
DATE FILED: August 14, 1996

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
JP	7-215014	August 23, 1995

INT-CL: [06] G05 D 1/03, G08 G 1/04

US-CL-ISSUED: 701/41; 701/23, 701/117, 180/167, 180/169
US-CL-CURRENT: 701/41; 180/167, 180/169, 701/117, 701/23

FIELD-OF-SEARCH: 701/23, 701/28, 701/41, 701/42, 701/117, 701/118, 701/119, 701/208, 701/300, 180/167, 180/168, 180/169, 180/408, 180/410, 180/411

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected Search ALL Clear

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
☐	3668624	June 1972	Spaulding	340/905
☐	4215759	August 1980	Diaz	180/168
☐	4361202	November 1982	Minovitch	180/168
☐	4401181	August 1983	Schwarz	340/905

☐	4656406	April 1987	Houskamp	318/587
☐	4656463	April 1987	Anders et al.	340/572
☐	4846297	July 1989	Field et al.	180/169
☐	4962457	October 1990	Chen et al.	701/200
☐	4986384	January 1991	Okamoto et al.	180/169
☐	5000279	March 1991	Kondo et al.	180/169
☐	5036935	August 1991	Kohara	180/279
☐	5127486	July 1992	Yardley et al.	180/168
☐	5172315	December 1992	Asanuma et al.	701/28
☐	5189612	February 1993	Lemercier et al.	701/23
☐	5218542	June 1993	Endo et all.	701/27
☐	5229941	July 1993	Hattori	701/26
☐	5249027	September 1993	Mathur et al.	356/3.14
☐	5289183	February 1994	Hassett et al.	340/905
☐	5295551	March 1994	Sukonick	180/167
☐	5331561	July 1994	Barrett et al.	701/205
☐	5347456	September 1994	Zhang et al.	364/424.02
☐	5357432	October 1994	Margolis et al.	701/23
☐	5369591	November 1994	Broxmeyer	701/301
☐	5381095	January 1995	Andrews	324/326
☐	5387916	February 1995	Cohn	342/44
☐	5416711	May 1995	Gran et al.	701/117
☐	5420794	May 1995	James	701/117
☐	5424726	June 1995	Beymer	340/902
☐	5434781	July 1995	Alofs et al.	701/23
☐	5504482	April 1996	Schreder	340/995

FOREIGN PATENT DOCUMENTS

FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
A-0420447	April 1991	EP	
A-2242174	September 1991	EP	
58-183514	December 1983	JP	
1-253007	October 1989	JP	
3-142505	June 1991	JP	
A-2235313	February 1991	GB	
A-2275792	September 1994	GB	

ART-UNIT: 361

PRIMARY-EXAMINER: Nguyen; Tan

ATTY-AGENT-FIRM: Kenyon & Kenyon

ABSTRACT:

An automatic steering system which reduces formation of a wheel track by changing a relative position of a vehicle with respect to a road. A reference line is provided along a road so that a vehicle moves along the reference line. The vehicle moves on the road while an amount of shift from the reference line is controlled to be equal to a target amount of shift. The amount of shift is a distance between a predetermined position of the vehicle and the reference line. A moving line of the vehicle is fluctuated with respect to time in a direction substantially perpendicular to an extending direction of the reference line. Alternatively, the reference line may be shifted in a direction substantially perpendicular to the extending direction of the reference line.

29 Claims, 15 Drawing figures

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L4: Entry 21 of 23 File: USPT Aug 17, 1999

DOCUMENT-IDENTIFIER: US 5938707 A
** See image for Certificate of Correction **
TITLE: Automatic steering system for automatically changing a moving line

Application Filing Date (1):
19960814

Detailed Description Text (4):
Each of the magnetic markers 12 generates a magnetic field extending upwardly of the road. The intensity of the magnetic field is maximum at a position directly above each of the magnetic markers 12. In the present embodiment, the magnetic markers 12 are buried in the center of a lane of the road. Hereinafter, a line extending along the center of the lane, which line connects each magnetic marker 12, is referred to as a reference line 13. In FIG. 1, the reference line is indicated by a double dashed chain line. Each of the beacons 14 is provided with a transmitter and a receiver so as to communicate with the administration center 16. The administration center 16 obtains information including accident information, construction information and traffic control information. The administration center 16 generates a guiding signal based on the obtained information, and sends the guiding signal to the vehicle 10 via the beacons 14.

Detailed Description Text (7):
The vehicle 10 is provided with a camera 26 monitoring a front view of the vehicle 10. An image taken by the camera 26 is supplied to the ECU 20. The ECU 20 detects the state of a wheel track formed on the road in front of the vehicle 10.

Detailed Description Text (8):
The vehicle 10 is also provided with a navigation apparatus NAVI 28 to determine a current position of the vehicle 10. The navigation apparatus NAVI 28 utilizes a Global Positioning System (GPS). The navigation apparatus NAVI 28 detects a current position of the vehicle 10 by using a map matching method, and supplies the position data to the ECU 20 together with map data. The ECU 20 calculates a radius of curvature of a road based on the position data and the map data supplied by the navigation apparatus NAVI 28.

Detailed Description Text (18):
The wheel track processing circuit 60 is provided to set a moving line in consideration of a wheel track as it is formed on the road surface. The wheel track processing circuit 60 is connected with the camera 26, the yaw rate sensor 30 and the side acceleration sensor 32 as shown in FIG. 3. The wheel track processing circuit 60 determines the presence of a wheel track and a state of the wheel track based on the data with respect to directional movement of the vehicle 10 supplied by the yaw rate sensor 30 and side acceleration sensor 32 and image data of the front view supplied by the camera 26. If it is determined that growth of the wheel track is to such a degree that a stable running can be achieved when the wheels are off the wheel track, a moving line is set so that the wheels of the vehicle 10 are off from the wheel track. Accordingly, a signal corresponding to such a moving line is supplied to the amplification rate changing circuit 52. Thus, the depth of the wheel track on the road does not increase. The depth of the wheel track may be reduced since the road surface adjacent to the wheel track is lowered by wearing.

On the other hand, if it is determined that a depth of the wheel track is so large such that a stable running cannot be achieved when the wheels are offset from the wheel track, a moving line is set so that the center of the vehicle 10 corresponds to the center between the two wheel tracks on the road. Accordingly, a signal corresponding to such a moving line is supplied to the amplification rate changing circuit 52. As a result, a stable movement of the vehicle 10 can be achieved when deep wheel tracks are formed on the road. In this case, if the wheel tracks are filled with water, which condition may cause hydroplaning phenomenon, speed of the vehicle 10 may be controlled to avoid such hydroplaning phenomenon.

Detailed Description Text (33):
If it is determined, in step 112, that the guiding signal is not received, the routine proceeds to step 116. In step S116, it is determined whether or not the road on which the vehicle 10 is running is curved. This determination is made based on data of a current position of the vehicle 10 supplied by the navigation apparatus NAVI 28. The determination may be made based on an image taken by the camera 28. In an alternative case, the determination of a curve may be made by receiving curve information from the beacons 14.

Detailed Description Text (36):
If it is determined, in step 122, that the vehicle 10 is being maintained in wheel tracks, the routine proceeds to a step 122. In step 122, is determined whether or not the wheel tracks in front of the vehicle 10 can be detected by the camera 26. If it is determined that the wheel tracks can be detected by the camera 26, the routine proceeds to step 124. In step 124, a center position between the two wheel tracks is detected.

Detailed Description Text (51):
In the present embodiment, the magnetic markers 12 are used as means for generating magnetic signals along the reference line 13, and the magnetic pickup sensors 22 and 24 are used to detect the magnetic signals. However, the signals generated along the reference line 13 are not limited to the magnetic signals, and other signals such as a laser beam, an infrared beam or an ultrasonic wave may be used. Additionally, an image recognition of a white line may instead be used to provide the reference line 13.

Detailed Description Text (53):
In the present embodiment, the infrastructure comprises a plurality of groups of magnetic markers 82, a monitor camera 84 located on a road side, and an administration center communicating with the magnetic markers 82 and the monitor camera 84.

Detailed Description Text (55):
The monitor camera 84 is provided for monitoring a condition of wheel tracks formed on the road. Image data of the monitor camera 84 is supplied to the administration center 86. The administration center 86 is provided with information including road construction information and accident information in addition to the image data generated by the monitor camera 84. The administration center 86 selects the magnetic marker 82-k which should generate a magnetic signal based on the construction information, the accident information and the image data.

Detailed Description Text (60):
In the present embodiment, the administration center 86 performs an operation shown in FIG. 14. When the operation shown in FIG. 14 is started, it is determined, in step 300, whether or not there is correction information with respect to the moving path. In this operation, it is determined that the correction information is present when one of the following conditions is detected; 1) a guiding signal for avoiding a construction area or an accident area is received by the administration center 86; and 2) wheel tracks are detected by the monitor camera 84.

Detailed Description Text (77):
Further, when the vehicle 90 detects a state of wheel tracks based on behavior or motion of the vehicle 90 or image data taken by the camera 26, information with respect to the detection may be supplied to the infrastructure. Thus, the infrastructure can obtain information with respect to the state of wheel tracks in an area where the monitor camera 84 is not installed. In this regard, the present embodiment is effective to reduce installation cost of the infrastructure.

Current US Cross Reference Classification (4):
701/23

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Search Results - Record(s) 1 through 10 of 31 returned.

☐ 1. Document ID: US 20030073886 A1

Using default format because multiple data bases are involved.

L10: Entry 1 of 31 File: PGPB Apr 17, 2003

PGPUB-DOCUMENT-NUMBER: 20030073886
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030073886 A1

TITLE: Biological condition measurement apparatus and method, mobile unit navigation system and method, library apparatus, and computer program

PUBLICATION-DATE: April 17, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Yanagidaira, Masatoshi	Saitama		JP	
Yasushi, Mitsuo	Saitama		JP	

US-CL-CURRENT: 600/300

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw. D

☐ 2. Document ID: US 20030062827 A1

L10: Entry 2 of 31 File: PGPB Apr 3, 2003

PGPUB-DOCUMENT-NUMBER: 20030062827
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030062827 A1

TITLE: Method of setting display, method of setting instrument panel, setting structure of instrument panel and setting structure of display

PUBLICATION-DATE: April 3, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Nagai, Yoshiaki	Tokyo-to		JP	
Harasawa, Naoki	Tokyo-to		JP	
Kitamura, Meiji	Tokyo-to		JP	

US-CL-CURRENT: 313/504

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D...

☐ 3. Document ID: US 20030060936 A1

L10: Entry 3 of 31 File: PGPB Mar 27, 2003

PGPUB-DOCUMENT-NUMBER: 20030060936
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030060936 A1

TITLE: Driving assist system

PUBLICATION-DATE: March 27, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Yamamura, Tomohiro	Yokohama		JP	
Kitazaki, Satoshi	Yokohama		JP	
Hijikata, Shunsuke	Yokohama		JP	

US-CL-CURRENT: 701/1; 348/148

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D...

☐ 4. Document ID: US 20030025599 A1

L10: Entry 4 of 31 File: PGPB Feb 6, 2003

PGPUB-DOCUMENT-NUMBER: 20030025599
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030025599 A1

TITLE: Method and apparatus for collecting, sending, archiving and retrieving motion video and still images and notification of detected events

PUBLICATION-DATE: February 6, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Monroe, David A.	San Antonio	TX	US	

US-CL-CURRENT: 340/531; 340/519, 340/521, 340/540, 340/541, 709/200, 709/207

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D...

☐ 5. Document ID: US 20030025597 A1

L10: Entry 5 of 31 File: PGPB Feb 6, 2003

PGPUB-DOCUMENT-NUMBER: 20030025597
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030025597 A1

TITLE: Automotive lane change aid

PUBLICATION-DATE: February 6, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Schofield, Kenneth	Holland	MI	US	

US-CL-CURRENT: 340/435; 340/463, 340/465, 340/901

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

☐ 6. Document ID: US 20020198632 A1

L10: Entry 6 of 31 File: PGPB Dec 26, 2002

PGPUB-DOCUMENT-NUMBER: 20020198632
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020198632 A1

TITLE: Method and arrangement for communicating between vehicles

PUBLICATION-DATE: December 26, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Breed, David S.	Boonton Township	NJ	US	
DuVall, Wilbur E.	Kimberling City	MO	US	
Johnson, Wendell C.	Signal Hill	CA	US	
Lukin, Kostyantyn Alexandrovich	Kharkov		UA	
Konovalov, Vladymyr Michailovich	Kharkov		UA	

US-CL-CURRENT: 701/1; 701/213

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

☐ 7. Document ID: US 20020169528 A1

L10: Entry 7 of 31 File: PGPB Nov 14, 2002

PGPUB-DOCUMENT-NUMBER: 20020169528
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020169528 A1

TITLE: Electronically tracked road-map system

PUBLICATION-DATE: November 14, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
How, Hoton	Belmont	MA	US	

US-CL-CURRENT: 701/23

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Drawi D

☐ 8. Document ID: US 20020164962 A1

L10: Entry 8 of 31 File: PGPB Nov 7, 2002

PGPUB-DOCUMENT-NUMBER: 20020164962
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020164962 A1

TITLE: Apparatuses, methods, and computer programs for displaying information on mobile units, with reporting by, and control of, such units

PUBLICATION-DATE: November 7, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Mankins, Matt W. D.	Somerville	MA	US	
Fridman, Leonid	Somerville	MA	US	
Harkavy, Brad	Cambridge	MA	US	
Platsidakis, Michael	Mansfield	MA	US	
Selker, Edwin J.	Arlington	MA	US	
Whiton, Adam M.	Boston	MA	US	

US-CL-CURRENT: 455/99; 455/1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Drawi D

☐ 9. Document ID: US 20020151992 A1

L10: Entry 9 of 31 File: PGPB Oct 17, 2002

PGPUB-DOCUMENT-NUMBER: 20020151992
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020151992 A1

TITLE: Media recording device with packet data interface

PUBLICATION-DATE: October 17, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47

Hoffberg, Steven M.	West Harrison	NY	US
Hoffberg-Borghesani, Linda I.	Acton	MA	US

US-CL-CURRENT: 700/83; 700/17, 700/18, 700/86, 700/87

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw. D

☐ 10. Document ID: US 20020130953 A1

L10: Entry 10 of 31 File: PGPB Sep 19, 2002

PGPUB-DOCUMENT-NUMBER: 20020130953
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020130953 A1

TITLE: Enhanced display of environmental navigation features to vehicle operator

PUBLICATION-DATE: September 19, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Riconda, John	Valley Stream	NY	US	
Geshwind, David Michael	New York	NY	US	

US-CL-CURRENT: 348/115; 348/148, 382/104, 382/254

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw. D

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Terms	Documents
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☐ 11. Document ID: US 20020126913 A1

Using default format because multiple data bases are involved.

L10: Entry 11 of 31 File: PGPB Sep 12, 2002

PGPUB-DOCUMENT-NUMBER: 20020126913
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020126913 A1

TITLE: Image processing apparatus and method

PUBLICATION-DATE: September 12, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Kotake, Daisuke	Kanagawa		JP	
Katayama, Akihiro	Kanagawa		JP	

US-CL-CURRENT: 382/282; 382/284

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

☐ 12. Document ID: US 20020112026 A1

L10: Entry 12 of 31 File: PGPB Aug 15, 2002

PGPUB-DOCUMENT-NUMBER: 20020112026
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020112026 A1

TITLE: Apparatuses, methods, and computer programs for displaying information on signs

PUBLICATION-DATE: August 15, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Fridman, Leonid	Somerville	MA	US	
Mankins, Matt W. D.	Somerville	MA	US	

US-CL-CURRENT: 709/217; 340/988, 455/566, 455/99

☐ 13. Document ID: US 20020111146 A1

L10: Entry 13 of 31 File: PGPB Aug 15, 2002

PGPUB-DOCUMENT-NUMBER: 20020111146
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020111146 A1

TITLE: Apparatuses, methods, and computer programs for displaying information on signs

PUBLICATION-DATE: August 15, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Fridman, Leonid	Somerville	MA	US	
Mankins, Matt W.D.	Somerville	MA	US	
Harkavy, Brad	Cambridge	MA	US	
Porter, Edward W.	Boston	MA	US	

US-CL-CURRENT: 455/99; 455/73

☐ 14. Document ID: US 20020095255 A1

L10: Entry 14 of 31 File: PGPB Jul 18, 2002

PGPUB-DOCUMENT-NUMBER: 20020095255
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020095255 A1

TITLE: Vehicle, and apparatus for and method of controlling traveling of the vehicle

PUBLICATION-DATE: July 18, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Minowa, Toshimichi	Mito		JP	
Nakamura, Kozo	Hitachiohta		JP	
Takenaga, Hiroshi	Naka-gun		JP	
Endo, Yoshinori	Mito		JP	
Morizane, Hiroto	Hitachi		JP	
Yoshikawa, Tokuji	Hitachi		JP	
Nakamura, Mitsuru	Hitachinaka		JP	
Komuro, Ryoichi	Hitachi		JP	

US-CL-CURRENT: 701/96; 123/352, 180/170, 701/93

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

☐ 15. Document ID: US 20020091991 A1

L10: Entry 15 of 31 File: PGPB Jul 11, 2002

PGPUB-DOCUMENT-NUMBER: 20020091991
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020091991 A1

TITLE: Unified real-time microprocessor computer

PUBLICATION-DATE: July 11, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Castro, Juan Carlos	Miami	FL	US	

US-CL-CURRENT: 717/106

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

☐ 16. Document ID: US 20020084891 A1

L10: Entry 16 of 31 File: PGPB Jul 4, 2002

PGPUB-DOCUMENT-NUMBER: 20020084891
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020084891 A1

TITLE: Apparatuses, methods, and computer programs for displaying information on vehicles

PUBLICATION-DATE: July 4, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Mankins, Matt W. D.	Somerville	MA	US	
Harkavy, Brad	Cambridge	MA	US	
Platsidakis, Michael	Mansfield	MA	US	
Whiton, Adam M.	Boston	MA	US	

US-CL-CURRENT: 340/425.5; 340/815.4

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

☐ 17. Document ID: US 20020080618 A1

L10: Entry 17 of 31 File: PGPB Jun 27, 2002

PGPUB-DOCUMENT-NUMBER: 20020080618
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020080618 A1

TITLE: Vehicle headlamp apparatus

PUBLICATION-DATE: June 27, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Kobayashi, Shoji	Shizuoka		JP	
Komatsu, Motohiro	Shizuoka		JP	
Sugiyama, Hidetada	Shizuoka		JP	
Masuda, Takeshi	Shizuoka		JP	

US-CL-CURRENT: 362/466; 340/988, 362/276, 362/465

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Drawi D

☐ 18. Document ID: US 20020077910 A1

L10: Entry 18 of 31 File: PGPB Jun 20, 2002

PGPUB-DOCUMENT-NUMBER: 20020077910
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020077910 A1

TITLE: Advertisement information providing system

PUBLICATION-DATE: June 20, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Shioda, Takehiko	Saitama		JP	
Saito, Yukitaka	Saitama		JP	
Shibasaki, Hiroaki	Tokyo		JP	
Shimada, Masae	Tokyo		JP	

US-CL-CURRENT: 705/14; 701/1, 701/200

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Drawi D

☐ 19. Document ID: US 20020075159 A1

L10: Entry 19 of 31 File: PGPB Jun 20, 2002

PGPUB-DOCUMENT-NUMBER: 20020075159
PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020075159 A1

TITLE: Rearview mirror assembly incorporating electrical accessories

PUBLICATION-DATE: June 20, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
DeLine, Jonathan E.	Holland	MI	US	
Lynam, Niall R.	Holland	MI	US	

US-CL-CURRENT: 340/815.4; 340/438

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De

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☐ 20. Document ID: US 20020070872 A1

L10: Entry 20 of 31 File: PGPB Jun 13, 2002

PGPUB-DOCUMENT-NUMBER: 20020070872
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020070872 A1

TITLE: Interior rearview mirror system incorporating a directional information display

PUBLICATION-DATE: June 13, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Deline, Jonathan E.	Holland	MI	US	
Lynam, Niall R.	Holland	MI	US	

US-CL-CURRENT: 340/815.4; 340/438

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De

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Terms	Documents
L9 and ((steer$ or speed$) with control$)	31

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Search Results - Record(s) 21 through 30 of 31 returned.

☐ 21. Document ID: US 20020065046 A1

Using default format because multiple data bases are involved.

L10: Entry 21 of 31 File: PGPB May 30, 2002

PGPUB-DOCUMENT-NUMBER: 20020065046
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020065046 A1

TITLE: Apparatuses, methods, and computer programs for showing information on a vehicle having multiple displays

PUBLICATION-DATE: May 30, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Mankins, Matt W. D.	Somerville	MA	US	
Fridman, Leonid	Somerville	MA	US	

US-CL-CURRENT: 455/59; 455/456.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De

☐ 22. Document ID: US 20020041328 A1

L10: Entry 22 of 31 File: PGPB Apr 11, 2002

PGPUB-DOCUMENT-NUMBER: 20020041328
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020041328 A1

TITLE: Direct broadcast imaging satellite system apparatus and method for providing real-time, continuous monitoring of earth from geostationary earth orbit and related services

PUBLICATION-DATE: April 11, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
LeCompte, Malcolm	Westford	MA	US	
Hewins, Michael	Belvedere	CA	US	

US-CL-CURRENT: 348/144

☐ 23. Document ID: US 20020036907 A1

L10: Entry 23 of 31 File: PGPB Mar 28, 2002

PGPUB-DOCUMENT-NUMBER: 20020036907
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020036907 A1

TITLE: Vehicle headlamp system

PUBLICATION-DATE: March 28, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Kobayashi, Shoji	Shizuoka		JP	
Masuda, Takeshi	Shizuoka		JP	
Inoue, Takashi	Shizuoka		JP	
Suzuki, Kazuhiro	Shizuoka		JP	

US-CL-CURRENT: 362/464

☐ 24. Document ID: US 20020022927 A1

L10: Entry 24 of 31 File: PGPB Feb 21, 2002

PGPUB-DOCUMENT-NUMBER: 20020022927
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020022927 A1

TITLE: GPS vehicle collision avoidance warning and control system and method

PUBLICATION-DATE: February 21, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Lemelson, Jerome H.	Incline Village	NV	US	
Pedersen, Robert D.	Dallas	TX	US	

US-CL-CURRENT: 701/301; 340/436, 342/455

☐ 25. Document ID: US 20020009978 A1

L10: Entry 25 of 31 File: PGPB Jan 24, 2002

PGPUB-DOCUMENT-NUMBER: 20020009978
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020009978 A1

TITLE: Units for displaying information on vehicles

PUBLICATION-DATE: January 24, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Dukach, Semyon	Boston	MA	US	
Mankins, Matt W.D.	Somerville	MA	US	
Fridman, Leonid	Somerville	MA	US	
Harkavy, Brad	Cambridge	MA	US	
Platsidakis, Michael	Mansfield	MA	US	
Whiton, Adam M.	Boston	MA	US	

US-CL-CURRENT: 455/99; 455/345, 455/457

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

☐ 26. Document ID: US 20020005778 A1

L10: Entry 26 of 31 File: PGPB Jan 17, 2002

PGPUB-DOCUMENT-NUMBER: 20020005778
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020005778 A1

TITLE: Vehicular blind spot identification and monitoring system

PUBLICATION-DATE: January 17, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Breed, David S.	Boonton Township	NJ	US	
DuVall, Wilbur E.	Kimberling City	MO	US	
Johnson, Wendell C.	Signal Hill	CA	US	

US-CL-CURRENT: 340/435; 340/436

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

☐ 27. Document ID: US 20020003571 A1

L10: Entry 27 of 31 File: PGPB Jan 10, 2002

PGPUB-DOCUMENT-NUMBER: 20020003571

PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020003571 A1

TITLE: Video mirror systems incorporating an accessory module

PUBLICATION-DATE: January 10, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Schofield, Kenneth	Holland	MI	US	
O'Brien, Frank	Holland	MI	US	
Bingle, Robert L.	Holland	MI	US	
Lynam, Niall R.	Holland	MI	US	

US-CL-CURRENT: 348/148

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

☐ 28. Document ID: US 20010034575 A1

L10: Entry 28 of 31 File: PGPB Oct 25, 2001

PGPUB-DOCUMENT-NUMBER: 20010034575
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20010034575 A1

TITLE: Running control device for a vehicle

PUBLICATION-DATE: October 25, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Takenaga, Hiroshi	Tokai-mura		JP	
Kuragaki, Satoru	Hitachi		JP	
Morizane, Hiroto	Hitachi		JP	

US-CL-CURRENT: 701/96; 180/170

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

☐ 29. Document ID: US 20010020777 A1

L10: Entry 29 of 31 File: PGPB Sep 13, 2001

PGPUB-DOCUMENT-NUMBER: 20010020777
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20010020777 A1

TITLE: Methods for controlling a system in a vehicle using a transmitting/receiving transducer and/or while compensating for thermal gradients

PUBLICATION-DATE: September 13, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Johnson, Wendell C.	Signal Hill	CA	US	
Du Vall, Wilbur E.	Kimberling City	MO	US	
Breed, David S.	Boonton Township	NJ	US	

US-CL-CURRENT: 280/735; 180/273

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

☐ 30. Document ID: US 20010013825 A1

L10: Entry 30 of 31 File: PGPB Aug 16, 2001

PGPUB-DOCUMENT-NUMBER: 20010013825
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20010013825 A1

TITLE: Interior rearview mirror system incorporating a light-emitting information display

PUBLICATION-DATE: August 16, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
DeLine, Jonathan E.	Holland	MI	US	
Lynam, Niall R.	Holland	MI	US	

US-CL-CURRENT: 340/425.5; 340/438, 340/691.6

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

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Terms	Documents
L9 and ((steer$ or speed$) with control$)	31

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Search Results - Record(s) 31 through 31 of 31 returned.

☐ 31. Document ID: US 20010003439 A1

Using default format because multiple data bases are involved.

L10: Entry 31 of 31 File: PGPB Jun 14, 2001

PGPUB-DOCUMENT-NUMBER: 20010003439
PGPUB-FILING-TYPE: new-utility
DOCUMENT-IDENTIFIER: US 20010003439 A1

TITLE: Rearview mirror assembly incorporating electrical accessories

PUBLICATION-DATE: June 14, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
DeLine, Jonathan E.	Holland	MI	US	
Lynam, Niall R.	Holland	MI	US	

US-CL-CURRENT: 340/815.4; 340/438, 340/461, 340/525, 359/871, 362/494, 362/503

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De

Clear | Generate Collection | Print | Fwd Refs | Bkwd Refs | Generate OACS

Terms	Documents
L9 and ((steer$ or speed$) with control$)	31

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